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NOTES ON THE FEEDING-HABITS OF THE DUNLIN (*TRINGA ALPINA*).

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WHAT follows is mainly a record of a certain phase of the Dunlin's active life, from direct observation and from a study of the imprints left on the feeding-grounds. Its relations with other birds and with its own kind are bound up so intimately with its feeding-habits that no apology is needed for dealing with them now.

Several species are named in the books as associates of the Dunlin, and the information is sufficient to indicate that the smaller waders are its most intimate companions. The Dunlins feed alongside of the larger waders, and pass through their flocks as a body, but as a general rule they do not mingle freely with birds much larger than themselves. When they fly along the coast in search of a feeding-place the Dunlins are likely to pitch beside any species of wader, and they may not stay if it is taking food which does not suit them. I have seen a party alight beside Knots which were devouring small mussels, and after a momentary glance take to flight. Common in winter is the sight of a party of Dunlins tripping along in the wake of a Ringed Plover. They follow the long runs of the Plover, and probe eagerly close to it at each halt. At least one of them is sure to examine the place from which the Plover extracted something at the end of its run. They probe a little on the way, and

occasionally the Ringed Plover doubles back in an attempt to secure whatever a Dunlin is on the point of taking. Sometimes Dunlins working independently of other species alight to probe for a short time, and fly away without having found anything of value as food. This is true especially of smooth stretches of sand. At the same time, they are quite able to find their own food, and a large part of their feeding is done in the absence of other species, or in places where the mingling of species is a coincidence.

The relation of this species to others may be regarded from a different point of view. Dunlins in search of food are remarkably easy of approach; at rest and in the company of other waders they are not so confiding. Their absorption in the work of finding food is apparently complete until the cries of the other species, most of them alert to a degree, warn the Dunlins to beware. When Ringed Plovers give the warning I find usually that the Plovers alight first and the Dunlins later. Where Dunlins are asleep, a few Ringed Plovers may be standing wide-awake or running about amongst the sleeping birds, ready to call at the approach of danger. It is not that the Dunlins need the warning, for they are less approachable when they are sleeping than when they are feeding actively.

I am inclined to believe that Dunlins are more partial to the company of other waders as the shooting season advances, especially in districts where they are harassed severely. In spring and autumn they are seen more often alone. On one occasion I witnessed a peculiar action by two members of a party of Dunlins and Ringed Plovers which were resting on the high-water mark—the Plovers watchful as usual, the Dunlins apparently asleep. About an hour after the time of full tide, when the latter were waking up and stretching their wings, an individual of each species detached itself from the flock and ran some fifty yards over the sand to the water-line. The Ringed Plover led the way, and the Dunlin followed closely. Arriving at the water-line the Plover looked about and ran quickly to certain spots, in which it dug its bill, the Dunlin inspecting and tapping the same spots after the Plover. Having done this the Plover turned and ran back to the flock with the Dunlin immediately behind probing here and there on the way. The flock



remained quietly for a few minutes, then flew to the place which had been inspected by the pair, and began to search eagerly for food.

What the mental state underlying these actions may be is largely a matter of opinion. It seems to be a variable and varying blend of curiosity, sociability, and selfishness, if we humanize the motives for the convenience of description. Perhaps long-continued dependence on the sense of touch has reduced the acuteness of vision below the level maintained by birds with which the Dunlin associates intimately—an acuteness of vision most necessary in dealing with areas showing the most trifling signs of the presence of food. I do not mean that there is an actual diminution in the keenness of vision. What I venture to suggest is that Dunlins sometimes forget to use their eyes. Habitually absorbed in the art of rapid and incessant probing, they are inclined to depend on other eyes for the detection of danger; on feeding-grounds which show slight surface markings or none at all their actions indicate that they are unable to find hidden objects without applying the test of touch, and as in a given time the bill covers a more limited field than a keen sense of vision does, they may rely in part, and it may be unconsciously, on the judgment of other birds.

Apparently they take an interest in the doings of their neighbours, and on occasion they act as if they were assisting or robbing each other. Usually the small animals are seized, extracted from the ground and swallowed rapidly—so rapidly that the steps are not always easy to follow. Sometimes there is delay, particularly when worms of fair size are captured. If not too late, the Dunlins may forestall the first-comer, and by their interference allow the object to escape, but as a rule the capture of a big mudworm is the signal for the nearest Dunlins to hurry to the spot, not to probe immediately but to examine the place by sight, then to tap and probe once or twice and disperse. I have notes of two instances of a less common kind. A Dunlin probed into a colony of mudworms and tugged vigorously without result. It was seen by another, which introduced its bill alongside that of the first. Both pulled together several times, and extracted a worm about three inches long. The second arrival took the worm a short distance away and devoured

it piecemeal; the other resumed probing immediately. A Dunlin pulled a fairly large worm out of its burrow so far and apparently was unable to move it farther. The Dunlin displayed its excitement by tugging energetically, and by stamping on the mud with its feet. Another ran up at once and displaced it, not by direct attack but by introducing its bill into the burrow and seizing hold of the worm. The former let go and retreated a few paces. It soon returned and seized the free end of the worm. Together they dragged the worm out of its burrow, and in the act of being swallowed the worm broke, and each bird got a portion.

We may impute human motives to these attractive birds, but a little consideration will show the propriety of trying to find an explanation in closer agreement with what is known of their character. In the general case, the sight of a Dunlin capturing a small animal of unusual value was sufficient to distract the attention of other Dunlins from their own occupations, and to revive a train of memories in their minds, of which the automatic and outward expression was a general movement to the area to see and probe for themselves. This I have called "curiosity" for want of a better word, but it is not exactly so, for the Dunlins would know perfectly what was likely to be found. In the two special instances matters went farther, and while the primary intention may have been robbery, the subsequent actions seemed to be something more pardonable. If, in the general case, the first Dunlin had not been so prompt in swallowing the worm, plainly the new-comers would have attempted to secure it, and if in each of the special instances the second Dunlin went forward with the same idea in its mind as I imagine to occur in the general case, we may suppose that the continued presence of a struggling worm would fill its mind with the one idea of securing the worm, so that other ideas would be crowded out or placed in abeyance. This does not deny them a lively sense of *meum* and *tuum*. I have never known Dunlins to interfere with another species which was struggling with a resisting worm, but the respect which they entertain for other species would have full play from the first, and would prevent their minds from becoming saturated with the idea of securing the worm. Once the single idea has been allowed to develop (and its development

would not be hindered by consideration of the first-comer, because the Dunlin would have no reason to expect opposition; as far as can be seen, Dunlins do not fight with one another or display resentment) the Dunlin goes forward unable, unless some potent interruption overturns the state of its mind, to receive impressions, and incapable of performing actions other than those called into being by the one idea. It is engaged with nothing but the capture of the worm, and when the worm is swallowed the incident is forgotten. The first Dunlin is in a similar condition. Already occupied and excited by the idea of securing the worm, it becomes frantic when the worm resists extraction unduly, and in such a state it is not able to consider what the new-comer is going to do. It may continue to tug at the worm as if nothing had happened, or it may be driven away temporarily paralyzed by the shock of the second Dunlin's approach. Then the idea of securing the worm, dissipated for a moment by the fresh impression, returns with absorbing force, and the Dunlin goes back to the worm as if no other bird was there.

Now a Curlew, to take an example in similar circumstances, would never think twice of questioning the right of an intruder, but then the Curlew is sedate in its ways, and for a bird its mind is fairly well balanced. The Dunlin, on the contrary, is a nervous, feverishly energetic, excitable bird, and the thread which connects its reason and consciousness with its bodily functions is slender and easily cut. A lack of self-control may be assumed for another reason. The Dunlin is one of those waders which are liable to "bobbing"—that peculiar, rhythmical, backward jerk of the head and body, or of the head alone—in moments of excitement from anxiety, fear, and other causes. During each jerk and sometimes during the series the eyes have a dull and vacant expression, but the observer must be very near to see this.

It may be said that the frantic excitement of the Dunlin is due to fear of robbery—that its continued endeavour to secure the worm is the feeble expression of its resentment. On the surface this explanation is satisfactory, but if we try to analyse the actions by themselves, and in relation to the general activities of the bird, and to picture what is going on within the skull,

it will be seen that the former explanation, apparently the more complex, is in reality the simpler. So that any slight or unusual excitement or irritation will act on the centres of the brain presiding over the motor system through the sense organs without the control or intervention of the higher centres—in other words, without knowledge and understanding, will set in motion actions which habit has associated with particular sensations, and what appears to be robbery and the prevention of robbery resolves itself into automatic though complex movements which in fairness may be excused.

Turning to the way in which the Dunlin finds its food, I wish first to mention the senses of smell and hearing as possible guides. Much has been made of the difficulty of approaching wildfowl down-wind, and the cause has been sought in a keen sense of smell. This may be perfectly true, but it happens that these birds rise up-wind either as a matter of convenience or of necessity, and travel for a time towards the observer who is approaching down-wind. Hence an early start must be made to maintain the margin of safety that each species finds necessary. Of hearing, I can say little, and that not much to the point.*

While it is impossible, without making a difficult and needlessly cruel experiment, to deny the importance of the senses of smell and hearing, the general evidence places both below two of whose value there can be no doubt—the senses of sight and touch. It is convenient to group them according to their use singly or together, if we remember that there is no hard-and-fast line between each, and that there is scarcely anything to which both cannot be applied. Sight alone is represented by surface-feeding, and by work in places crowded with open burrows in which the occupants are near the surface and within view; touch alone by the exploration of seaweed, of ground under water, of muddy and sandy ooze, and the sand along the high-water mark; sight and touch by work on areas in which the food supply is scanty and the signs of it indefinite, and in dealing with mud Crustacea which have retreated into the recurved portions of their burrows.

Surface-feeding includes the search for small objects drifting

* Cf. Patten, 'Aquatic Birds,' p. 277.

in the wash of the sea and in streams, for small insects and spiders* crawling on the land, but the common form of surface-feeding is the capture of small univalves. When the acorn-shells that encrust the rocks in many places die they leave behind them rings of lime, each narrowing towards the top and adherent to the rock at the base. In these asylums small Periwinkles dwell in comparative safety, and wherever they are numerous they become objects of interest to the Dunlin. At certain times molluscs are seen in large numbers on expanses of sand after the tide has ebbed, and in myriads on the ooze of some land-locked bay or harbour. The Dunlin, attentive to the signs, runs swiftly over the sand, turning at the end of its beat to cross the area in a fresh direction. When a considerable number are present the general effect of the crossing and re-crossing is of a game of inviting and avoiding collisions which may go on ceaselessly for an hour at a time, and it is only at long intervals that a Dunlin is seen to bend down and seize hold of a small univalve. At any time it may turn aside from its course with the utmost rapidity to take a mollusc which has caught its eye in passing. The same thing occurs on the mud and on the rocks, only the speed is limited by the nature of the ground. They run shorter distances at a time, and incline to move in one general direction, though they run this way and that as the signs dictate. Here again they pick up shells at long intervals of time and space.

From a study of the birds' habits alone it is difficult to understand this boundless display of energy, and if the gizzards were not packed with shells† the actions of the Dunlins might be taken to prove that something else was the object of pursuit. On the sand and rock the shells are present in hundreds, on the mud they are crowded together so closely that scarcely an inch of ground separates one from another, yet the Dunlins select a shell here and a shell there for some reason or other. True the shells on the sand vary in size, and many of them are too large for the Dunlins' throats to pass, while in the case of the shells on the rocks a limit is imposed by the relative size of the Periwinkles to that of the surrounding rings. But these restrictions

* Alston, 'Zoologist,' 1866, p. 513.

† Swinhoe, 'Ibis,' 1863, p. 412.

do not apply to the shells on the mud, which scarcely vary more than from an eighth to a sixth of an inch in length. These mud shells afford a possible explanation. Close inspection shows that they rest upright on the mud, that large numbers of them are empty, and that many others are in an unhealthy condition. The gentle flow of the tide is insufficient to disturb their balance, and the general appearance of all is the same. If we watch quietly we may see a shell here and there move slightly, rest for a while, and move slightly again. It is the same with the shells on the wet sand and the rocks. In this, as I venture to think, we have an explanation of the Dunlin's feverish display of energy and apparent delicacy of taste. It overruns the ground watching for the slightest movements made by the molluscs from time to time. In this way it guards itself against shells which are empty and shells whose occupants are dead or dying. Some other waders do the same thing in a different way, but the only way open to the Dunlin is to run ceaselessly hither and thither.

In similar fashion the Dunlin treats areas of mud crowded with the open burrows of worms and thin-skinned Crustacea, providing a sufficient number of the occupants are near to the surface. It is, however, more circumspect in its movements, it runs more slowly, and at the last moment, when on the point of making a capture, it rushes forward or to one side and plunges its bill quickly into the mud in an attempt to seize one of the lurking animals on which it feeds.

Search by touch alone is to some extent a misnomer. A certain amount of visual information is necessary to begin with, and it is a valuable adjunct during the process of tapping. The Dunlin proceeds slowly a step or two at a time in no particular direction, and drives its bill rapidly up and down in and out of the ground, testing it very completely in front and on both sides. From time to time it runs or flies to a fresh place and begins again, but there is no evidence to show that the new place is chosen for any special reason. In the course of the up and down movement the bill shows a noticeable tremor.* At times this tremor is more marked, and is seen to be vertical. To close inspection it reveals itself as a lesser up and down movement

* Macgillivray, 'History of British Birds,' iv. pp. 207-213.

with a minute deviation of direction at each downstroke. So each stroke of the bill is of a compound nature. There is the main stroke, and during it a number of lesser strokes, which bring the point of the bill into contact with a larger surface. At intervals the Dunlin finds something good to eat. This is made plain by its eagerness, by the deeper sinking of the bill, the snapping of the mandibles and their sudden withdrawal, grasping an object which, if small enough, is swallowed before the bill is entirely clear of the ground. If contact is made with a worm the bill is propelled downwards over the upper end of the worm by a number of quick thrusts, the mandibles being separated during the thrusts and closed tightly on the worm between each, when the reverted cusps on the palate and the edges of the mandibles prevent the worm from slipping back into its burrow. The result is that an equal length of the worm is grasped by the whole length of the bill, and the worm is ready for extraction, which is effected by one or more steady and gentle pulls. The need for this even distribution of pressure is understood when the extreme softness and fragility of the worms are taken into account.

The method of feeding by touch alone is applied to soft ground under water, to muddy ooze and shifting sands in which food is abundant and exhibits no surface markings, to seaweed whether attached to the rocks or drifting up shore on the waves, to moss and spongy turf, and to the strip of firm sand along high-water mark. This part abounds usually with Sandhoppers and the larvæ of flies which leave no visible marks by which they can be traced. The process here is more one of rapid tapping than of probing the sand. As they flounder over very soft ooze they may be seen to plough the mud steadily with their bills, and to draw them about as if they were tracing patterns of complicated design. Probably they act under water in the same way, but it is not easy then to be sure.

Where sight and touch are given together, I mean to express uncertainty as to which sense is the more important. They are illustrated by the movements of Dunlins on smooth and fairly dry sandy areas, inhabited by a moderate number of thin-skinned Crustacea. These animals in their subterranean burrowings leave aggregations of minute pits here and there on the

surface of the sand. These impressions may be mistaken for those of a bird, and have been attributed to worms. The Dunlin runs over the sand looking for these marks, and also, as I imagine, for disturbances of the sand made by the movements of the crustaceans. When it decides on a likely place it probes the sand rapidly in a certain direction until it comes on the small animal. The same method is applied to Sandhoppers, and the Dunlin is remarkably agile in leaping to secure the crustacean if it jumps. When they are racing over the wet sands during the ebb in search of univalves they are attentive to the worm-casts, and can be seen now and then to plunge their bills hurriedly into casts and to draw out small worms. The extrusion of the casts is not continuous. It occurs periodically, and, as the worms are very near to the surface at the time, I believe the Dunlins overrun the sand on the look-out for castings in the moment of extrusion, when they are able to capture worms which may be out of reach at other times. The same combination is used on areas showing no visible surface-markings, and where the supply of food is limited. The Dunlins probe for a while in one place, and look about for another place to treat in the same way. So engaged they are most liable to sight objects it may be a yard away, and to run swiftly to secure them. This applies to several kinds of ground, and includes the search for small bivalves in the sand. On muddy areas crowded with open burrows, into which the inhabitants have retired as far as they can go, the Dunlins run about looking for what they can find. The worms are beyond reach, but many of the Crustacea have the terminal portions of their burrows recurved; in some cases the blind ends are within a quarter of an inch of the surface and close to the entrance. The Dunlin inspects these burrows, and in some instances taps gently round the entrance with an evident purpose, for it suddenly plunges the bill very obliquely into the mud and reaches upwards with the point. Even then it may miss its object, and the bill is seen to travel in a curved course towards the entrance of the burrow as if following the crustacean, the capture of which may be signalled at any moment by the snapping of the mandibles. For a long time I puzzled over these actions, repeated so frequently, and it was not until I found mud plastic enough

to admit of section that I saw the nature of the recurved burrows and the operations of the Dunlin upon them.

The imprints left by the Dunlins on the sand and mud are worthy of consideration. In surface-feeding there is nothing to note save, perhaps, the absence of certain univalves from their tracks. On the areas of open burrows single probings are seen often wide apart, and, as I will explain later, they are of the deep variety. As a rule each coincides in position with a burrow. For an obvious reason, ground under water, very liquid ooze, and wet sand show no markings, or else they are so much run as to be of no value. The firm sand along the high-water mark is best for the purpose. The hidden animals leave no surface-markings, and the Dunlins tap and probe rapidly in search of food. When they have been on this kind of sand for any length of time it becomes covered with the tracks of feet and bill. The imprints made by the bill are of three kinds,* distinguished not so much by the sharpness of their differences as by the frequency with which the average forms occur. They are a slight double dent in the sand made by a gentle pressure with the point of the bill; a shallow probing, an eighth to a quarter of an inch in depth, usually but not invariably divided into two compartments by a transverse septum of sand; a deep probing, a quarter to half an inch or more in depth, and complete in the sense of having no septum. The relative frequency of the three kinds is variable and depends on a number of conditions, of which the appetite of the Dunlin, the nature, position, and relative abundance of the hidden animals seem to be the most important. As much of the sand is covered only at spring tides, imprints are added at each high water during neap tides, until the imprints nearly cover the sand for considerable stretches, especially if the Dunlins are many and no rain has fallen. Excluding sand which has been visited more than once, we find that the distribution of imprints is patchy, crowded together in some places, scanty in others†—that they are more numerous near clumps of seaweed and decaying vegetable matter. The larvæ are more plentiful in these situations, and may lie in bundles close to the surface under contiguous imprints, which

* Macgillivray, 'History of British Birds,' iv. pp. 207-213.

† *Ibid.*

shows that the Dunlins miss more than they find. The tapings and septate probings may occur singly or in lines of two or three each, and may or may not end in a deep probing. Deep probings may be found together or singly at wide intervals, with or without associated septate probings. The number of contiguous tapings and septate probings may be great. I once counted forty in line, gradually deepening to end in a complete probing, and on another occasion forty-seven, when no deep probing was present. This was on a small patch of half-dried mud overlying coarse gravel, and when the mud was sifted nothing was found. The contiguous lines of probings may be straight or curved, directed forwards or to one side, and a fairly common form is a circle of ten to twenty tapings and septate probings, ending in a complete probing near the first tapping. As a general rule, ten to a hundred imprints are found on the square foot, of which rather less than half are deep probings, but the ratio may be as high as one in three hundred, or even one in five hundred. To produce a tapping the mandibles are required to be separated one millimetre at the tip, to produce a septate probing two or three millimetres. The length of a septate probing is five to six millimetres, which is considerably shorter than the seven or eight millimetres of a double probing made experimentally with a closed bill, and the ten to thirteen millimetres of the double complete probing occurring in nature. The deep probing is directed slightly forwards, is cylindrical in the upper part, and expanded towards the end into a semi-bulbous form, the concavity being on the front aspect of the probing, a relation which can be learned by comparing the probing with the corresponding footmarks.

That the mandibles are separated in the act of tapping and probing runs contrary to accepted opinion; while the construction of the bill, with its guarded tip, points to its use with the mandibles closed. Direct observation of so small a detail is not easy on account of the Dunlin's rapid movements, but it can be made when the bird comes between the observer and still water which is reflecting the light of a white cloud. I have chanced on these ideal conditions twice. On the first occasion during rapid probing the mandibles were separated all the time. The degree of separation varied a little, and at times

the bill was opened up to its base. On the second occasion the bill was sometimes opened and sometimes closed during the downstrokes, but I suspect that the apparent closure was due to my inability to see a trifling separation of the mandibles towards the tip of the bill. Though the shallow probings are not always septate, formation of the delicate septa may be prevented by various causes, and in default of a septum it is seldom that a semilunar ridge cannot be found across the floor of each probing. The present view gains support from observation of the actions of waders which are larger and slower than the Dunlin; septa occur, to my knowledge, in the shallow probings of the Lapwing, Snipe, Common Sandpiper, and Redshank, and the method attains its greatest development in Starlings and Rooks, which often test the ground with the tips of the mandibles separated as widely as they can be.

So there is evidence for the belief that the mandibles are separated during search, and that the separation increases as the bill goes deeper, but they remain nearly parallel until the bottom of the deep probing is reached, when, as a writer has suggested,* the terminal part of the upper mandible is expanded in contact with the capture—a movement which appears to be reflected in the form of the deep probing. The partial separation of the mandibles makes introduction of the bill more easy, it increases the tactile area, and may, by comparison between the two points of contact, afford a clearer idea of the form and consistence of hidden objects. One advantage of the extensile mechanism lies in the fact that the minimum quantity of sand has to be pushed aside,† though I am unable to agree with Mr. Workman in supposing that the bill is closed during introduction, to prevent the mouth from being filled with dirt. The existence of septa in the shallow probings seems to me to prove that the open bill can be driven into and out of the ground without being soiled, but when the bird makes a capture it has to swallow the material of which the septum is composed. In this way I account for the large quantity of extraneous matter, sand, mud, rootlets, and the like, which is found in the

* Pycraft, 'Ibis,' 1893, p. 361.

† Workman, 'Ibis,' 1907, p. 614.

stomachs of some waders killed on soft ground. It does not appear to be an inconvenience to them, and the friction generated by the particles of sand and mud during the act of prehension may help the birds to deal with the slippery animals which are their food.

When the supply of food is scanty the imprints are reduced to a small number per square foot, and usually they are of the deep kind, but have lost the typical form. This is due to the Dunlins feeding by sight and touch together, when the apparent tremor of the bill becomes more marked. The probings are expanded irregularly. They may be elongated, wedge-shaped, with the base directed downwards, or converted into circular pits, and if they are opened gently the walls are seen to be covered with numbers of nipple-shaped depressions. On the level sands, where active Crustacea are the objective, we see long lines of footmarks leading in every direction, and here and there isolated deep probings, or lines of contiguous septate probings, each line ending in a complete probing. Where it is sandworms, we see in places a single deep probing in the most recent part of a worm-casting, which is always small.

I have tried probes made of various materials, but for delicacy of touch none of them is equal to bone covered with soft skin. When contact is made with a living animal a peculiar quivering sensation is experienced, like that felt on touching a vibrating chord. At the same time the animal, especially if it is a worm, stiffens itself preparatory to making its escape. If it is a shell it appears to rise up slightly and proceed slowly to close its operculum or valves. This feeling can be obtained not only by contact with the probe, but also, after a little practice, through a quarter of an inch of intervening soil. It is, I imagine, a sensation like this that guides the Dunlin, in addition, of course, to the disturbance of sand and mud which the animals make when in motion, and it serves to distinguish living animals from inanimate objects offering an equal degree of resistance* to the bill.

* Macgillivray, 'History of British Birds,' iv. pp. 207-213.

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By HUGH BOYD WATT.

ANNEXED is a brief list which is believed to contain entries of the principal works on the above-named subject, but which can probably be amplified, particularly for suburban districts within the area of Greater London. County avifaunas, such as Harting's 'Birds of Middlesex,' Christy's 'Birds of Essex,' and Bucknill's 'Birds of Surrey,' have not been included.

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THE VOCAL AND INSTRUMENTAL MUSIC OF INSECTS.

By A. H. SWINTON.

ON leaving the orchestra of the Cicadas to listen to the instrumentation of the saltatorial Orthoptera, we pass from the rattle of kettledrums and the harlequin overtures of the Crickets that make melody at the mouth of their holes, and the troubadour performances of the strolling Grasshoppers fall on the ear like the clash of the cymbals and thrill of the violin. The males of the Mole-Crickets and Crickets have a raised fiddle-bow more or less S-shaped on the under surface of their fore wings or elytra, along which runs a musical comb, and when one is rubbed on the other this sounds out loudly in the Crickets that have resonant, oval, and triangular patches that resemble the glassy calms on the swirl of a running stream, and more subdued in the Mole-Crickets, whose wing-covers, like a kid glove, are pliant and velvety. The Leaf-Crickets (*Laubheuschrecken* of the Germans) carry their comb beneath the left fore wing and fiddle it over the right, and hence, by setting these musicians with their fore wings on edge, the creaking of the House-Cricket, the grating sound of the Wart-Biter, and the shrill of the Great Green Leaf-Cricket can be reproduced at will in the solitude of the study, where perhaps there is lack of pleasant associations, for ladies on hearing these sepulchral noises are wont to exclaim, "Oh, dear!" The Crickets and Leaf-Crickets themselves interpret and appreciate them, having ears on the shins of their fore legs consisting of a silvery membrane or drum, to which a ganglion of the nervous cords is attached; they are easily seen on the legs of the Field-Crickets, and on those of some of the Leaf-Crickets the drum will be found to be double; a slit further indicates that the ears of the Mole-Crickets are on the femora of their transformed fore legs. This method of hearing is well adapted to creatures that pass their lives in subterranean

galleries, and the Leaf-Cricket on the bough stretches out its often long fore legs to listen with the pride that a Spaniard exhibits the calves of his shins at a bull-fight.

According to Dr. Henry Woodward and others, the gigantic horsetails and ferns that covered the swamps of Europe at an early period were populated by Cockroaches and kinds of Mantis, and when the leaves of the woodland appeared then Crickets and Leaf-Crickets were seen. The Mole-Crickets and Field-Crickets are now distributed over Europe, Africa, Asia, and America, and, as neither fly far, their genealogy recalls vast geological ages.

The European Mole-Cricket (*Curtilla* vulgaris*) haunts moist meadows, and frequents the sides of ponds and the banks of streams, where it excavates its galleries like the Mole with a pair of hands that resemble gardening gloves, and lives the troglodyte life of the immature Cicada. I have only seen it alive on the flowery meadows that border the Hamble River in Hampshire.† Gilbert White, who lived at Selborne, in the same county, says that during fine weather about the middle of April, and just at the close of day, the males begin to solace themselves with a low jarring note continued for a long time without interruption, not unlike the "churr" of the Goatsucker. This croaking note that sounds "ree-ree!" Latreille found soft and pleasing; when laid hold of Yersin says it performs "yea-yea!" which is no doubt more pathetic. About the beginning of May the female lays her sand-coloured eggs, over which, Dr. Ratzeburg says, she keeps watch. The European Mole-Cricket, that possesses no leaping power to assist it to take flight, has been seen at the close of day poised on its fan-shaped wings rising and falling in the air; and Dr. Abel, when travelling in China, was surprised, when the candles were lit in his boat on the river, to see a Mole-Cricket of large size fly in at the window, and sometimes one was found in the beds. In the north of India and Cashmere a small Mole-Cricket is abroad from July to September; it closely resembles the one usually met with in South America. The male

* The nomenclature is in agreement with the recent Orthopterous Catalogues compiled by Mr. Kirby, and published by order of the Trustees of the British Museum.—Ed.

† For other British localities, cf. Zool. 1906, pp. 357, 437, 470.

of the Common Mole-Cricket of North America (*Neocurtilla borealis*) commences its music as early as four o'clock in the afternoon, but becomes more noisy at dusk; its gruesome notes "gru-gru!" resemble, it is said, the croak of a Toad at the spawning season, mellowed by distance. The small *Tridactylus variegatus* that digs in the sand of the rivers of Southern Europe jumps well, but is mute. I have specimens of a similar insect common in India.

In the 'Transactions' of the Entomological Society of London for 1902, pls. vii. & viii., may be seen figures of the *Hydropedeticus vitiensis*, a Cricket with brushes on its hind legs, that was seen skating and jumping on the surface of the Upper Navua, a clear and rapid stream in the Fiji Islands; the male of this aquatic Cricket was not musical. The European Field-Cricket (*Acheta campestris*) and its congeners raise the sound of "cree-cree!" and when the males meet they become more noisy. Should one encounter a female he taps her with his antennæ, and plays staccato notes expressive of delight, after which, according to Goureau, he slowly makes off, his partner meekly following. There is a steep, abrupt pasture-field, interspersed with furze, close to the back of the village of Selborne, says Gilbert White, well known by the name of Short Lithe, consisting of a rocky dry soil and inclining to the afternoon sun, that abounds with the *A. campestris*. Here, sitting at the entrance of their caverns, they chirp all night as well as all day from the middle of May to July, and in the hot weather they make the hills echo. As they invariably run into their holes as you approach, although cannibals, their ways are best studied in confinement; a cage full of Crickets was the incentive to a quarrel in the history of 'Don Quixote,' and Gilbert White found that the tunes of a male suspended in the parlour imprisoned in a paper cage marvellously delighted some hearers, filling their minds with a train of summer ideas of everything that is rural, verdurous, and joyous. Now, when the Arcadian plain is much monopolized by wheat and mangolds, it is still possible to picnic among the beeches on Selborne Hanger, where the air of summer softly blows, and meditate on the past. That Capt. Chawner captured the large moth *Ophiodes lunaris* here is, I believe, pleasant fiction; doubtless it is an alien. I have a small specimen of *Deilephila*

euphorbiæ that was sighted flying one afternoon along the weedy bank of the River Hamble that I imagine had come over the water in a lobster-smack or French lugger. All creatures like to bask during winter in the artificial warmth of fires and candles, hence Crickets and Cockroaches have become domesticated and go voyages on board ship, and the latter, from indolence, have become like the Dodo and Solitaire, more or less apterous. In the autumn of 1873 an omnivorous brood of young House-Crickets (*Gryllus domesticus*) were scampering over the grate of a London kitchen in Maida Vale, and the following winter, as the bellows kindled the fire to a ruddy glow, the hearth commenced to echo to a tune of "awhit-awhit!" resembling the sound of a stone running along the ice; this continued as long as the fire burnt brightly, but when it got low a doleful "wee-wee!" was alone heard at intervals. One evening, when left in charge of the house, I heard this uncomfortable lament, and on descending found the servants vanished, and the steps, of which they had availed themselves in their flight, placed against the area railings. When the mornings were frosty and the coals smouldered the Crickets prolonged their music until the break of day, and once I surprised a Christmas party making merry at noon. I captured a female whose charms were the cause of this unusual excitement, and then the uproar subsided; but when I set her free, and she had rejoined her companions, it recommenced. When enclosed together the House-Crickets have a fight. The small Wood-Cricket (*Nemobius sylvestris*) abounds on the Continent, and in August, 1898, I heard the males making a reposeful snoring "ru-ru!" in a ferny coppice at Bagnoles. Mr. Scudder says the Black Cricket (*Gryllus niger*) of North America sounds out "cree!" and the Spotted Cricket (*Nemobius vittatus**) sounds "ru!" The loud music with which the *Æcanthus pellucens* that lives on the trees and bushes of the Leopoldsberg hails the sunset is commented on in the 'Monatschrift' of Vienna. In Switzerland it is found among *Artemisia*.

It is said that the larger number of the Leaf-Crickets are South American, and South America is doubtless their native country. The males as a rule have a more or less S-shaped, raised, musical

* *N. fasciatus*, De Geer, var. *vittatus*, Scudd. (Kirby, Syn. Cat. Orthopt. vol. ii.).

comb on the left elytron or fore wing, which they fiddle over the edge of an oval glassy patch on the right with a shrill resembling the "tric-tric!" of a brownish-green Grasshopper-Warbler that preys on them; one would fancy in the days of old they were more numerous. A large group has a female with a somewhat straight ovipositor resembling the blade of a carving-knife. The October of 1891 I passed in the town of Nantes, surrounded by market-gardens, whence a corpulent peasant-proprietor was wont to drive to market in a wheelbarrow drawn by a couple of labouring dogs. Many of the women wore the Norman sugar-cone hats endeared by childish histories, and the best hotels were primitive; in the one in which I found myself there was a large tub of Garden Snails (*Helix aspersa*) in the backyard, to make broth for the evening repast that concluded with a chicken-bone and dandelion salad. The bedrooms were swarming with the small brown Cockroaches (*Blatta germanica*), that soon discovered my setting-boards. But to compensate for any discomfort there were the most delicious pears to be had for a few pence, and the finest wild blackberries I ever saw I found in my ramble on the ridge known as the Sillon de Bretagne, where, on October 5th, I espied one of the cymbal-players, the hunched-backed *Ephippiger vitium*.* The males, whose saddle-shaped thorax forms a case for their parchment drums, came stalking over the ensanguined bramble-leaves, crisp and sere, with a defiant "snip-snap!" resembling the clicks of a steam-engine or a couple of jingles of the horse-bells; and then, after a suggestive pause, one of them performed a solo, when the notes of its crumpled, crinkled drums clashed and tinkled to the dance music of a tambourine, with ever and anon a refrain of "sweep-sweep!" or "sweet-sweet!" The musician's enamorado seemed to be what servant girls call "perfect sillies," for when I held a stick to them, with a mincing and dainty pace they were ever wont to walk on to the end of it. And as they revelled in gay sounds, a female sat as motionless as a crocodile on a leaf below; on beholding her a male jumped down and gave her a bite, when she screamed like a weasel; she afterwards accompanied me to Southampton, where she died on Nov. 9th. When making a *post-mortem* examination I found the fiddle-bow with which she

* = *E. ephippiger*, Fiebig (1784) (Kirby, Syn. Cat. Orthopt. vol. ii.).

had executed this squeal in a neat little musical comb running along a raised edge that crossed the convex upper surface of the glassy patch on her right elytron, as Goureau has rightly indicated; while that of the male was to be found on a raised edge beneath the left, and came to view browner, broader, and coarser. Hence the music of the male is gruff and masculine, and that of the female shrill and feminine; one plays the bass and the other the treble. Around Vienna, from the commencement of August until October, they often perform duets in the bushes, where at intervals the male gives two chirps and the female replies with one.

Before leaving Nantes I took a trip down the Loire in one of the little steamers known as 'Bees' as far as the Island of Indret, and landed on the confines of the historical Vendée, where I was much impressed with the regal splendour of the departing year. The solitude of the country after the vivacity of the town inspired a moody melancholy; the vineyards around were spread with a funereal cloth of gold, and the fiery yellow and vermilion of the woodland appeared to be the glow of a vast conflagration. Beneath its shade the ground was overrun with dewberries, and I wandered on until I came to a country road, where I met with the *Ephippiger selligera*.* It was not unlike the former cymbal-player, but marine-green in colour, and a cylindrical body gave it much the aspect of a gun-carriage. These hunch-backed Crickets populated the pollard-oaks at the side of the way, and as I advanced a male would leisurely ascend to the topmost spray and play the requiem of summer with a "hist-oh-hist!" and then the other pollard-oaks rang afar with a "hist-oh-hist!" that sounded like the bubbling murmur of a brook. The road led on, and I saw I was coming to what seemed to be a picturesque village, which proved to be a small town with an hotel that had an arched doorway, into which the cows were driven. Yersin says the music of *E. provincialis*, which he found in the neighbourhood of Hyères the first days of August, is a "zig-zig!" No doubt the county echo adds melody to sounds that are harsh. The Katy-did (*Platyphyllum concavum*)† of North America climbs to

* = *Steropleurus andalusius*, Ramb. (Kirby, Syn. Cat. Orthopt. vol. ii.).

† = *Pterophylla camellifolia*, Fabr.

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the tree-top, and the woods resound with "katy-did-she-did!" the live-long night; the shrill, it is said, may be heard a quarter of a mile off.

Usually it is only the male Leaf-Cricket that is musical. It seems like the days of romance when the slow-sailing felucca, with noiseless wing, wafted Lord Byron from the distractions of the Villa Deodati, once honoured with a visit of Milton the poet, to enjoy the chiaroscuro of the evening and calm stillness of Lake Lemano, broken by the light drip of the suspended oar and the good-night carol of the omnipresent *Phasgonura virridissima* that La Fontaine mistook for a Cicada and Goureaux calls a Grasshopper. Heard at noon from the hedgerow elm, the fitful "zic-zic!" of the male of the Great Green Leaf-Cricket rings out in response to the din of the carriages hurrying to the racecourse, and recalls the monotonous street cry of "knives and scissors to grind"; and when the comfortless gloom gathers at eight o'clock in the chilly autumnal evening, until the hour that precedes midnight, the shuddering shrill of the predaceous horde of which it is a sentinel, resounds with deceptive echo from the suburban plot of white and-purple-flowered potatoes, running into a giddy whirl resembling machinery in motion. A male I had in confinement in the New Forest commenced its shrieking wail to the tune of the "Last Rose of Summer," in wild snatches at the accustomed hour, and as the daylight faded its strophies came in gushes of half an hour's duration, and terminated in a laconic chirp. Like the Robin and certain classical birds, Crow and Parra, it became uproarious in the oppressive weather, when the air grows light, presaging a shower of rain. While staying at Sangatte I had a male and female in confinement, and when I visited them one morning the male had utterly vanished, and the female, bloated and hideous, alone remained to explain the result of a disparity of temperament. The Great Green Leaf-Cricket is found all over Europe excepting Lapland, and I have met with it in the swamp in the Island of Guernsey, called the "Grand Mare," where Prof. Babbage found it on *Pyrola rotundifolia*, one of the last inhabitants of a submarine forest. Oak, firs, furze, and hazel have almost vanished, and yet the Speckled Wood Butterfly is plentiful, the Oak Eggar Moth zig-zags in the sunlight, and Large Footman Moths appear there. I have never

seen the Great Green Grasshopper use its wings in England, but when taking a stroll at Goschenen, in the St. Gothard Pass, I once watched one winging high overhead in the direction of a willowed brook. The male of the *Phasgonura caudata* of Eastern Europe, whose female is known by its longer ovipositor, is said to make less noise; it may be heard at Saarbruck, in Germany, where the Franco-German war commenced. When the rose hues dye the snowy summit of the Dent du Midi is the time to leave the gastronomy of sweet Clarens and ascend to the blackberry-gorge at Les Avants, where the music of the males of *P. cantans* is to be heard; their short spoon-shaped elytra distinguish them from those of the former species, and this seems the natural result of their sluggish and indolent ways. The violin playing of these slovenly Leaf-Crickets will appear sedative after the clatter of plates and dishes, for it resembles the drowsy song of the Greenfinch and snore of the sleeper; as you approach the grass seems to snore all around, and Nature becomes breathless as we grow when feeling most. On coming nearer the notes rattle away like the agates of a bracelet or a rain of diamonds, but the music is abrupt without the piercing shrill of the narrow, long-winged *virridissima*; unlike it, too, the males seek no concealment, and at the end of August and during September you may see them perambulating the upper surface of the leaves, where the female is wandering in the herbage below lost in wonderment. The habits are those of a Spider; she will seize on a Grasshopper when she sees it, bite off its legs, and, taking it gingerly by the head, slowly suck out its pulsating life until death arrives, as it came to Seneca the philosopher.

The green, fish-like *Conocephalus mandibularis*,* with a pencil-point to its head, abounds among the rank grass on the banks of the Po in August, where I met a man with a tin-can catching prime specimens as food for his Canary. It is also found at Agno, on Lake Lugano; at Mendrisio, on the banks of the Rhone below Geneva; and at Haguenin, on the Lake of Zurich. On Aug. 21st, 1878, I heard the male commence its whistle—a shrill and lively “vree!”—at eight in the evening, and its overtures sounded out from one to five minutes, with corre-

* = *Conocephaloides nitidulus*, Scop. (Kirby, Syn. Cat. Orthopt. vol. ii.).

sponding pauses; and when the full orchestra were aroused to action by the gathering dusk a bee-like buzz resounded all around, as it were the flutter of the oaten flute and plaintive moan of the sea-shell. When the moon arose and silvered the placid stream of the calm flowing Po they ceased their melody. Similar concerts may be heard in far-distant lands, for I have a nearly related species from the Brazils, and the *C. robustus* populates the seashore in the southern parts of New England. When the September sunshine enlivens the swamp of Villeneuve, at the head of the Lake of Geneva, the *Anisoptera fuscum*, a tiny brownish Leaf-Cricket with greenish legs that looks like a big Earwig, is wont to clamber up the stem of the reeds with an alternate sway of its long antennæ to the purple blossoms, where it sends out its evening challenge to its rivals in a Liliputian pussy-cat purr, or dirl, resembling a bracelet-watch running down, and sometimes, to while the live-long day, it twitters. Another programme animates the swamp of Villeneuve when the hoar-frost glitters over the reeds, and the skater is out on the ice trying the dance and the rolling Q.

(To be continued.)

ARCTIC WHALE FISHERY IN 1908.

By THOMAS SOUTHWELL, F.Z.S.

ACCORDING to Mr. Mitchell's Circular, six vessels took part in the Whale fishery in the season of 1908, two of which went to the Greenland Seas, one to Hudson Bay, and three to Davis Straits; the ketch 'St. Hilda' (79 tons) went to the Straits, where she obtained 235 Walruses, and the 'Queen Bess' (72 tons) brought home the produce of 7 White Whales, 82 Walruses, 1938 Seals, and 8 Bears, also obtained in Davis Straits. 'The Snowdrop' (64 tons) was sent out to Frobisher's Strait to land stores and fetch back produce from the station there; she has not been heard of since July last, and the fear is that she is lost.

Once again the Greenland fishery has been the more productive, ten of the fifteen Whales killed having been there obtained, one in Hudson Bay, and four in Davis Strait and Pond's Bay. The total produce consisted of 15 Right Whales, 540 White Whales, 899 Walruses, 3084 Seals, and 241 Bears, yielding $307\frac{1}{2}$ tuns of oil and $153\frac{1}{2}$ cwt. of bone. The 'Eclipse' also brought home from the Pond's Bay station the produce of one Whale, 671 Walruses, and 26 Bears; 165 Fox pelts were also received. With bone at about £2000 per ton, the total value of the produce may be estimated at between £29,000 and £30,000.

For the following events of the season I am indebted to my friend Mr. Robert Kinnes, of Dundee:—

The 'Balæna' and the 'Scotia' were the two vessels which went to Greenland; each vessel got a Whale of about 10 ft. 6 in. bone in the middle of May at the northern ground. The ice then broke up, and the 'Scotia' went to the southern ground; during her absence the 'Balæna' succeeded in getting three other Whales, one of 9 ft. bone and two others of 6 ft. or 7 ft., all in two days, about the middle of June. On the return north of the 'Scotia,' Capt. Robertson captured three Whales, all about

7 ft. to 8 ft. bone. These also were all taken in June, the weather being very fine, although the ice conditions were not so favourable. Both vessels went to the southern fishery in the end of June, where heavy Whales might be looked for. The 'Scotia' captured one on July 5th and another on the 10th, both being 7 ft. to 8 ft. bone. The 'Balæna' was not successful here, and the 'Scotia' pushed in towards the coast, where she met with a number of Musk Oxen, thirteen of which she killed, and brought home two alive, which the "red-tape" of our Board of Agriculture refused permission to be landed, doubtless much to the satisfaction of the Continental "Zoos."

The season in Davis Strait has again been very unproductive, perhaps owing to the condition of the ice, which has been very unfavourable. The 'Eclipse' did not see a single Whale. Mr. Kinnes says:—"I never before heard of an experienced captain like Capt. Milne of the 'Eclipse' going all over the well-known grounds, and covering more ground than usual, without seeing the blast of a single Whale; it looks to me as though Davis Strait was completely played out. There has been no fall fishing for the last three years in Davis Strait owing to bad ice conditions." The 'Morning,' however, saw a good many Whales, and captured two of over 10 ft. bone, losing two others; while the 'Diana' secured one small Whale.

NOTES AND QUERIES.

MAMMALIA.

Courage in *Putorius nivalis*.—Collectively, the Weasel is known for its fearlessness and ferocity. The following incident, told me recently by Col. Mure, of Caldwell, is interesting as throwing light upon the boldness of a single animal. He was crossing an open space of ground when he sighted a Weasel, and immediately gave chase. Gradually he overtook it, till when about fifteen feet from it the Weasel turned right round and made straight for him, screaming as loud as it possibly could. Such an incident gives one a trifle more respect for a solitary Weasel.—T. THORNTON MACKETH (The Hall, Caldwell, Renfrewshire).

AVES.

***Phylloscopus sibilatrix*.**—This (Jan. 9th) morning, when walking by the River Wye, my terrier disturbed a Warbler from a strip of gorse on the bank. I marked it down, and, sending the dog in front, it turned the bird back, flying past me within some six feet, and settling in a gorse-bush not more than five yards distant. As it apparently listened to locate its disturber, I had a fair view of it, and am convinced it was a Wood-Warbler. It then turned, hopping through the bush, and, coming through the top of it, flew past me again within a few feet, continuing along the top of a high hedge near, and I lost sight of it behind some trees. I searched this hedge and those adjacent, but did not see it again. Its plumage was very bright. The wood on the other side of the river is a resort of the species each spring. I am aware that the Willow-Warbler (*P. trochilus*) has been known to winter in Cornwall, but this was undoubtedly *P. sibilatrix*.—A. B. FARN (Breinton Lodge, near Hereford).

Nesting of the Nightingale (*Daulias lusciniæ*) on the Borders of Staffordshire and Shropshire.—It is with much pleasure that I can record an instance of the Nightingale nesting in Shropshire, within one mile of the Staffordshire border and not more than ten miles from

Wolverhampton, in May-June, 1907. My brother, Mr. Henry Duncalfe, and I noticed the birds early in May, and, although we made several journeys to the spot, were quite baffled in our attempts to find the nest until June 9th, when we saw one of the birds with a large green caterpillar in its bill, and after watching for some time it hurriedly disappeared amongst the thick herbage. The bird seemed exceedingly nervous, and was constantly flying from bush to bush, evidently very uncertain as to the wisdom of trusting us with its secret. We then found the nest, which was most carefully hidden in the bottom of a clump of nettles and briars growing on a steep hedge-bank, and it then contained two newly hatched young and one addled egg, which latter is now in our collection. The nest was composed of oak-leaves with a lining of fine twigs. We also located another pair about a mile from this spot, but failed to find their nest. Curiously enough, both these pairs were within a few yards of running water, but perhaps this is only a coincidence. I have only known single representatives of this species visit us very occasionally soon after their arrival in this country, and after a short time they disappear. I believe the males usually arrive some few days before the females, and perhaps this would account for the single birds we sometimes get. I have never heard of any nesting in our district before. We were hoping they would return to us again this summer, but unfortunately they did not, although, as far as we know, the young got off safely. Mr. H. E. Forrest, in his 'Fauna of Shropshire,' speaks of it as "being very sparingly distributed along the Severn Valley as far north as Shrewsbury," while Dr. McAlldowie, in his book on the 'Birds of Staffordshire,' says "it is an occasional summer visitant, although authorities include Staffordshire in its regular breeding area"; and again, later, he says: "During recent years it has been a rare visitor, its occurrence having only twice been recorded in the Annual Zoological Report of the North Staffordshire Field Club from 1886-1892." One cannot help feeling that the birds spoken of above really belonged almost as much to one county as to the other, as some of their excursions must have taken them over the border into Staffordshire. I should be very much interested to hear whether other ornithologists have heard of them breeding in either of the two counties lately, and if so, if they are regular visitors, or only turn up occasionally.—A. HUGH DUNCALFE (Perton, Wolverhampton).

Nesting of the Lesser Spotted Woodpecker (*Dendrocopus minor*) and the Great Spotted Woodpecker (*D. major*) in Staffordshire.—My

brother was fortunate enough to find a pair of Lesser Spotted Woodpeckers nesting in the top of an ash-tree on June 2nd, 1907, his attention being drawn to them by their curious note; and on June 14th, 1908, we found the Great Spotted Woodpecker nesting in a holly-stump. The nest was about ten feet from the ground and contained young, but notwithstanding the fact that the old birds must have been most anxious to keep their ravenous offspring well supplied with food, they were so shy and wary that it was most difficult to get a sight of them. We hope to see more of them next summer. As far as I can ascertain both species are rare in our district, though they may be easily overlooked owing to their retiring habits.—A. HUGH DUNCALFE (Perton, Wolverhampton).

Local Name of Corn-Crake.—The use of the name Bean-cracker for the Corn-Crake in South Pembrokeshire, as recorded by Mr. H. B. Booth (Zool. 1908, p. 431), suggests an interesting comparison with the name "Bean-crake" used for this bird in South Wexford. The resemblance is, I believe, in agreement with well-known historical facts.—G. E. H. BARRETT-HAMILTON (Kilmanock, Campile, Waterford, Ireland).

Bird Notes from the Tyrol.—Last year (1908) we took our holiday in the Austrian Tyrol, and as usual I seized every opportunity to see as much of the bird-life of the country we passed through as possible, and I must say I was greatly disappointed with the results, for we saw scarcely any birds, and the number of species noted was so few that I hardly like offering these meagre notes to the Editor, but they may be of interest to persons intending to pay a visit to this very beautiful part of Europe. Why birds are so scarce in the Tyrol was a mystery, for in all the three weeks I was there I never saw a peasant with a gun or heard a shot fired; so different to the South of France, where one often meets sportsmen with a string of Thrushes. Perhaps the Austrian peasants have given up shooting as a bad job, all the birds having been killed by the last generation.

I left London on July 29th. When passing through Switzerland I saw a pair of Storks (*Ciconia alba*) feeding their young on a farmhouse chimney. On Lake Zurich a Great Crested Grebe (*Podiceps cristatus*) was noted swimming close to the train, and out on the lake a few large hawks, probably Buzzards, were wheeling about. Landeck was reached on the 31st. Here the only birds I saw were some Great Tits (*Parus major*) feeding near the river, and a fine Crossbill (*Loxia curvirostra*) in a cage. Our next long stay was Trafoi, with

its beautiful snow mountain at the end of the valley, which is clothed with pine-wood. Here I saw Blackstarts (*Ruticilla titys*) for the first time. Up the mountain we heard Ravens (*Corvus corax*), and saw some Coal-Tits (*Parus ater*), and in the woods near the hotel I saw a Bullfinch (*Pyrrhula europæa*), a Thrush (*Turdus musicus*), House-Martins (*Chelidon urbica*), and a great many Chaffinches (*Fringilla cælebs*). On the way to our next place (Bozen) I noted one Hoopoe (*Upupa epops*), Yellowhammers (*Emberiza citrinella*), Wagtails (species?), Common Sandpipers (*Totanus hypoleucus*), a Kestrel (*Falco tinnunculus*), and a covey of Quail (*Coturnix communis*). From Bozen we took a carriage and drove over the Karrar, Pordoi, and Falzarego Passes. Birds still kept very scarce. However, I noted Pied or White Wagtails, Coal-Tits, Blackstarts, House-Martins, and Swallows (*Hirundo rustica*), the last two species very common in the valleys about villages. We saw no Swifts. One Blackbird (*Turdus merula*) was noted, also some Rooks (*Corvus frugilegus*). The wild flowers on the passes were exceedingly beautiful, and I noticed quite a number growing wild which we cultivate in our gardens at home. Butterflies and moths were not very much in evidence to the ordinary eye, but most likely an entomologist would have noted numerous species. I was greatly struck with a splendid large fritillary and a beautiful little black moth with pink spots on the wings.

Cortina was reached on Aug. 7th. It is beautifully situated by a river and surrounded by dolomite mountains. Here birds were not quite so scarce, and I had the pleasure of seeing two species new to me. One day, while coming down the river, I saw a bird about the stones. Hoping it was a Dipper, I crept up and had a good view of the Alpine Water-Ouzel (*Cinclus albicollis*). I could distinctly see the dark grey back wherein it differs from our species at home, which has a sooty-brown back. I looked out for this bird every time I went up the river, but never saw it again. Another day I saw a family party of Red-backed Shrikes (*Lanius collurio*), which had taken possession of a bush across the river. I had never seen this bird before, as it is extremely rare with us, so I was greatly pleased to get such a good view of this handsome species. I think there was a male, female, and two young, which were being fed from time to time by the old birds, for every now and again they would dart off across the field for insects exactly as our Flycatcher does. Along this river were a great number of Wagtails of different species, but they mostly seemed young birds. In the bushes I once saw a Sedge-Warbler (*Acrocephalus phragmitis*), and in the town Sparrows (*Passer domes-*

ticus) were quite common ; they were much lighter than our Sparrows, especially the hens.

The next place I got an opportunity of looking out for birds was Gossensass, in the Brenner Pass. They were few, as usual, and consisted of Redstarts (*Ruticilla phœnicurus*), females only, and numbers of Chaffinches ; also another finch which I could not make certain of. There seemed to be no birds about the town of Innsbruck. We walked out through great fields of maize to Schloss Ambros, and there I only saw a Mistle-Thrush (*Turdus viscivorus*), and the usual flocks of Chaffinches, which are as common as Sparrows at home. I paid a visit to the Innsbruck Museum to see a collection of local birds, most of them badly mounted and badly labelled, and rather depressing to look at. From this we came straight home, so I had no chance of seeing any more birds ; and I hope I have not taken up too much of your valuable space with these notes.—W. H. WORKMAN (Lismore, Windsor, Belfast, Ireland).

PISCES.

Large Take of Herrings in the Moy Estuary, Killala Bay.—Herrings were late in visiting the estuary this season, very few appearing until the beginning of November, when some large "schools" came in from the bay, and which, in the estuary, kept chiefly at the upper end, between Castleconnor and Roserk Abbey. At each side of that part of the estuary there is a line of training walls to keep the water in the main channel when the tide begins to fall, and which thus confined in the narrow space between the walls increases the "scour," deepening the channel. Between these and the shore there is a wide expanse of sand left bare at low water, with a small shallow channel running close along them, carrying off the water draining from the sands by a narrow opening at the end of the walls to the main channel. At high water, when the walls are covered, the Herrings spread over the estuary, wandering inside them ; but if they do not return to the main channel before the water falls below the end of the walls they are then imprisoned between these and the shore, and the only escape they have is through the narrow outlet at the end of the walls, and if the "school" is a large one they take a long time to pass out when crowding to the opening. If observed in time before escaping outside the walls the fishermen make fine hauls by placing nets across the outlets, and thus keeping the Herrings inside until by the fall of the tide they are left high and dry on the sands,

and are shoveled and basketed wholesale into boats and carts. This season, on Nov. 8th or 9th, the Herrings were observed inside the wall on the Mayo side and nets placed across the outlet, when an immense number were entrapped and kept inside until the tide left the banks, and then the grandest take of Herrings ever known in the estuary was obtained by two men, assisted by their families. One man named Boyd, assisted by his brothers and sisters, captured between 25,000 and 26,000, while his neighbour Patterson got 14,000. The former obtained £48 from a dealer, besides selling several thousands to other parties, and giving away a large quantity to the owners of horses and carts who assisted in carrying the fish to the dealer in Ballina. It was a grand haul for these two men for only part of a day's work, Boyd receiving over £50 for his part of the fish. After this great take Herrings remained for about a week in the estuary, and then left for the bay, when a gale of northerly wind set in. During the time they were in the estuary they were harried every night by a fleet of eighteen boats, but the takes were very irregular, varying from one to two thousand a boat down to a few hundreds.—ROBERT WARREN (Moy View, Ballina).

NOTICES OF NEW BOOKS.

The Sportsman's British Bird Book. By R. LYDEKKER.
Rowland Ward, Limited.

IN writing a book on British Birds Mr. Lydekker has struck new ground, for birds are rather outside his usual theme, while his treatment of the subject is a departure from the sameness of the orthodox path. The title of the book is explained in the text: "Written more expressly to meet the needs of the sportsman and the amateur rather than the requirements of the scientific ornithologist." Taxonomy is therefore treated as of secondary importance, and groups are used rather than families, the volume commencing with a description of "Game-birds," followed by "Pigeons," "Rail Tribe," "Crane Group," "Plover Group," and so on; but the text is full and informative to the highest degree, and the reader may here acquire a knowledge of the birds themselves, which after all is perhaps more important than their classification. For means of identification the numerous half-tone illustrations are as good as, if not better than, most we have met with, though we are told that in the great majority of instances they have "been photographed under the personal superintendence of Mr. Rowland Ward from specimens mounted at his studios in Piccadilly for this particular purpose." But they have the great merit of exhibiting essential and specific characters, some of them being taken from specimens lying on their backs when it is necessary to show fully the markings and pattern of the under side, so that the "sportsman and the amateur" have thus a facilitation in recognition of species, apart from the very concise descriptions given in the text. Great pains have been taken to describe the full geographical distribution of the British Birds, and, combined with other information, this volume—outside the classificatory arrangement—may be accepted as one of the best books of

its kind to give a sound and general knowledge of our avifauna to those who, not being "scientific ornithologists," wish to acquire a first-hand information from the birds themselves. It is a handsome volume, and should have a wide circulation among the readers to whom it is addressed.

It is, however, a question whether the "novel feature in the omission of the names of the authorities and observers of the facts recorded in this volume" is a good one. It is justified on the ground "that when a statement has once been published it becomes public property." This argument is undeniable, but at the same time there are observers and observers, and observations that have been verified and found not unusual, and others that rest on a single record; while the names of some recorders carry more authority than do those of others.

A List of Irish Birds. By RICHARD J. USSHER, M.R.I.A.,
M.B.O.U. A. Thom & Co., Dublin.

WHEN a list of Irish Birds is prepared by Mr. Ussher it possesses an authoritative value, more especially when each species is accompanied by a note on its status and other concise but interesting particulars. The first list of Irish Birds was compiled by the late A. G. More in 1885, and though a second edition appeared in 1890, according to Dr. Scharff in the preface, twenty-six other species have since been obtained which had not previously been observed in Ireland. In his introduction Mr. Ussher gives a list of twenty-eight species recorded from Ireland since More's list of 1890, but of these five are placed in square brackets, denoting "claim to admission is insufficient." Species with a "M" attached denotes that they are "represented in the Irish Collection of the Museum," whilst other signs distinguish those that either breed in Ireland or do so in every county.

In these days of expensive ornithological publications it is significant that this list with its imprimatur of authority and condensed information can be purchased for the small amount of *fourpence*!

Animal Romances. By GRAHAM RENSHAW, M.B., F.Z.S.
Sherratt & Hughes, Manchester.

THIS beautifully illustrated book, compared with the same author's recent 'Natural History Essays,' will possibly less interest zoologists in the reading, but has probably given its author more pleasure in the writing than was the case with the other mentioned volumes. Dr. Renshaw has a keen eye for the picturesque in environment, and he has an exceptionally keen and fluent pen in describing it, and these pages are an attempt, and a no unsuccessful one, to give by descriptive writing a panoramic view of a number of animals in their natural condition, and not as museum specimens or the inmates of zoological gardens. The work therefore is an "Animal Romance," written by a zoologist and a keen lover of nature, and appeals to a rather different world of readers than that to which his other books are addressed. We have only one criticism to offer to this method, and that is, it may suggest too much. As an instance of what we mean, reference may be made to the chapter entitled "Forest People," where we read: "A yellow butterfly flits past, and instantly a Jacamar has seized it, the golden wings fluttering to the ground." Now, if there is one question more than another that disturbs some entomological theories it is that of the attack on butterflies by birds, whether it is common or frequent, or on the contrary unusual and of little consequence. That birds do attack butterflies *sometimes* is in the cognizance of many travellers; the present writer has seen during his lifetime two or three examples, but Dr. Renshaw's picture implies a common occurrence, and thus promotes a too facile impression. As mentioned in the review of the author's last 'Natural History Essays,' we still anticipate with pleasure more of that series.

The Edible Fishes of New South Wales. By DAVID G. STEAD.
Published by Authority of the Government of the State of
New South Wales.

WE have previously noticed Mr. Stead's 'Fishes of Australia' (Zool. 1907, p. 360), and the present publication is confined to the Edible Fishes of New South Wales. By this term the

author tells us he means "all of those fishes which—while not being of a noxious or unpleasant character (such as Toad-Fishes, Porcupine-Fishes, &c.)—attain a marketable size, or else occur in sufficient abundance to render them of use as adjuncts to our food supply. Strictly speaking, of course, using the term in its widest application, it would necessarily include a host of small fry, like the Gobies, Blennies, &c.; but with one or two exceptions, such as these are not here taken into account." That this fish industry is not a negligible quantity is proved by statistics. During the five years 1903-7, 48,243,238 lb. (or 643,243 baskets) of fish have passed through the fish markets of New South Wales, and this does not include a large amount sold without passing through recognized trading centres.

Among game-fishes, the freshwater Perch (*Perca fluviatilis*) attains a weight "of at least 5 lb.," and is considered by anglers as "the finest sporting fish in our rivers, indigenous or introduced"; while of the most inedible or despised fishes something may be done, as there is a slight and perhaps growing demand for the pectoral flaps or "wings" of the Common Sting-ray (*Trygonoptera testacea*), and for years there has been a small export of dried Sharks' fins through the agency of the Chinese merchants.

To this useful volume there are attached eighty-one plates and a map showing the river drainage of New South Wales.

The Culture of Vegetables and Flowers. By SUTTON & SONS. Simpkin, Marshall, Hamilton, Kent & Co., Ltd. (Thirteenth edition, 1908.)

THE main subject of this excellent volume is outside the purview of 'The Zoologist,' but the chapter devoted to "The Pests of Garden Plants" is carefully and popularly, while yet scientifically, written and illustrated, and supplies a want. We have been frequently asked by gardeners and lovers of horticulture where this information in a concise and non-technical presentment may be obtained, and have no hesitation in saying that this publication is certainly one in which it may be found. To extirpate the living creatures that act as destructive pests to our

gardens becomes a lesson in economic entomology, for they must first be identified before the proper remedy can be applied. By the aid of these pages both results can be obtained, after which it is hoped this book may have fulfilled its purpose, and created an interest in further study which will require the perusal of other works of a more advanced biological standard.

EDITORIAL GLEANINGS.

BOTH in fresh-water angling and in sea-fishing many remarkably fine "specimen," or large, fish have been captured in the past year. Among the Salmon taken is a handsome specimen of 46 lb., caught in the Shannon at Castleconnell; Major Gerald F. Trotter has killed a 43 lb. Tweed fish; Mrs. Mossop one of 41 lb. in the Tay; and the Hampshire Avon, at Ringwood, has yielded Salmon up to 36 lb.

Mr. A. E. Hobbs has captured the largest Thames Trout of 8½ lb., and Mr. G. Lyne has landed a New River Trout of 8 lb. 9 oz. near Broxbourne; but the largest Trout have hailed from the Irish loughs, where fish of 17 lb. and 14 lb. are reported. Pike up to 27 lb. have been landed on the Norfolk Broads (Mr. Spashett); Mr. Zerfass (London) has taken a 25½ lb. Pike in the Herefordshire Wye; and Major Fraser one of 23 lb. in the Test, near Romsey.

Some remarkable Roach are reported caught; one of 3 lb. in the Dove and Dearne Canal, at Elsecar, Yorkshire, by Mr. W. W. Stenton; 2 lb. 13½ oz. by Mr. W. B. Firmin, at Hatfield; 2 lb. 12 oz. by Mr. F. L. Pearce, at Sturminster Marshall (Dorset Stour); 2 lb. 10 oz. by Mr. J. F. Wieland, in the Sussex Arun, at Amberley; and 2 lb. 3 oz. by Mr. R. Smith, in the Thames, at Shepperton. Mr. Pincott Hill has caught a magnificent Barbel of 9 lb. 13 oz. in the Thames at Sunbury.

A 19½ lb. Cod has been caught at Deal by Mr. A. W. Parker (City of London Piscatorials); Mr. Eldridge (Folkestone), one of 22 lb., at Ballycotton, where another angler has taken a monster Whiting of 4 lb.; Mr. H. T. Ashby has landed a great Skate of 175 lb. at Penzance, where Mr. Dent has captured a 20 lb. Pollack; at Herne Bay, Mr. Fitzmaurice has taken a 30 lb. 8 oz. Dog-fish; at Brighton, Mr. W. Vigar, a 34½ lb. Conger; and at Dartmouth, Mr. Barnett, a splendid Bass of 13 lb. 6 oz.—*Pall Mall Gazette*, Jan. 4th, 1909.

THE death took place on Sunday, at his residence, Leek, Staffordshire, of Sir Thomas Wardle, President of the Silk Association of Great Britain and Ireland, who was widely known as one of the greatest authorities of the day on all phases of sericulture and all branches of silk manufacture.

At the instance of Sir George Birdwood, who had been the first to call attention to the great possibilities of the commercial utilization of Indian *tusser*, the Secretary of State for India sent Wardle out in 1885 to report on sericulture in Bengal, and to collect typical silks from various parts of the country for the then approaching Colonial and Indian Exhibition at Earl's Court. This was the first of several visits to the Eastern Dependency, followed by reports and recommendations which contributed substantially to improve the methods of sericulture and to the growth of this branch of Indian trade. Sir T. Wardle's most conspicuous service in this respect was the revival of the industry in the valley of Kashmir. The industry was of ancient standing, but had fallen into neglect, and successive epidemics among the silkworms threatened it with complete destruction. It is not too much to say that in the early nineties this fate could not have been averted had not Sir Walter (then Mr.) Lawrence taken up the matter in his capacity as Settlement Officer of the State. Subsequently the subject came to the notice of Sir George Birdwood, and it was upon his initiative that Sir T. Wardle went out to Kashmir as expert adviser to the Durbar. How innumerable difficulties were overcome, and how a moribund industry was placed upon a footing of prosperity such as it had never before experienced, is told in detail in Sir T. Wardle's 'Kashmir and its New Silk Industry' (1904), in which he was able to state that sericulture, besides giving employment to large numbers of villagers in the "Happy Valley," brought the State Durbar a revenue of from £90,000 to £100,000 per annum. Sir Thomas had paid a further visit to Kashmir a few months before the book appeared, and had given advice as to the silk-weaving possibilities of the country.

Sir Thomas Wardle was nearing the completion of his seventy-eighth year, having been born at Leek on Jan. 26th, 1831.—*The Times*, Jan. 5th, 1909.

AN incident, which appears to confirm the theory that Partridges migrate, occurred at Margate this week. A large number of birds, which turned out to be French Partridges, were seen crossing the English Channel and approaching Margate. Upon reaching land

they seemed quite exhausted, and numbers were picked up in the streets of the town. "We have always thought that Partridges migrated about the mating season; otherwise, what becomes of the large stocks of birds left at the end of the shooting season? They have to find fresh quarters, as the land is insufficient to maintain increased broods."—*Shooting Times and British Sportsman*, Jan. 9th, 1909.

THE Selborne Society has revived the old title of its Magazine, which will henceforth be called 'The Selborne Magazine (and Nature Notes),' and will be published by Messrs. George Philip & Son, Ltd., of 32, Fleet Street, E.C. All communications with regard to the Society should be addressed to the Honorary General Secretary of the Selborne Society, 20, Hanover Square, London, as heretofore.

It is many years since the essentially farmers' sport of Pigeon-shooting has been practised with such success as this winter. That destructive scourge, suggestive of virulent diphtheria, which choked thousands of Pigeons last year has totally disappeared. The large flocks of migrant Pigeons—birds whose numbers differ enormously in different years—are all in wonderful plumage, which is the first sign of health, and very plump. As many as a hundred birds have been killed in an afternoon on many of the farms in Hertfordshire, Bedfordshire, and Buckinghamshire, and no doubt many other counties. The practice is to bait one or two favourable spots by a spinney or a clump of oak trees, erect a few shelters, and wait for the birds. In one parish—where a Rat and Sparrow Club has recently been restarted—over three hundred Pigeons and nearly one thousand Sparrows have been killed since the beginning of the year. The Pigeon is, of course, shot for the sport it affords and the food it provides, but it is also usually regarded as one of the most destructive of birds. An examination of the crops of some of these birds recently shot in the home counties reveals the fact that, like most other birds, their feeding habits are useful as well as harmful to the farmer. Acorns and beech-nuts are a favourite diet, but the birds also eat in considerable quantities the bulbs of *ranunculus* or buttercup. The weed is of little good, very hard to eradicate, and the Wood-Pigeon is the only bird that is an effective enemy.—*Daily Mail*, Jan. 14th, 1909.

